


STAT



September 21, 1970

Attention: John C.

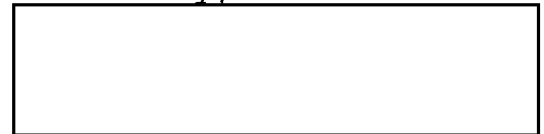
Dear John:

Enclosed for your files are three (3) copies of
Activity Summary,  2201201-AS-14.

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Sincerely,



Senior Staff Scientist

PSC/c
Enclosures

Declassification Review by NGA/DoD

September 21, 1970

ACTIVITY SUMMARY

To: John C.
From: [REDACTED] STAT
Subject: Contract Visit to Customer Facility [REDACTED] STAT
Reference: [REDACTED] 2201201-AS-14 STAT
Date(s): September 16, 17, 1970

On September 16, 17, a program visit to the [REDACTED] 25X1
[REDACTED] facility was conducted under Contract
[REDACTED]

25X1
STAT
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[REDACTED] The purpose of this visit was to continue implementation of the image manipulation program at the customer facility. As previously discussed, the objectives of the present effort are directed to the manipulation of very low contrast imagery recorded at or near the system resolution limit, where the limit is determined by the optical or photographic system component, or their combined effects. This task is being implemented by setting up a partially coherent optical system for viewing and manipulating the low contrast input image, and by fabricating real transmission functions for manipulation of the frequency spectrum of the input target. The operations will therefore be performed with system modifications (e.g. continuous control of the system coherence from a high degree of

spatial coherence to a very low degree of spatial coherence) and with filters (e.g. high pass filters, low frequency attenuation filters, low pass filters, etc.). The specific details of the program are described in the Program Plans attached to Activity Summaries.

During these two days the optical system was modified as a low contrast test target output was studied. The modifications included insertion of a 100 μm pinhole in place of a 25 μm pinhole, providing an increase of 16 in intensity. The spatial coherence ($\gamma_{12} = 0.88$) with the 10 inch collimating lens is now 0.4 mm, sufficiently high for coherent processing of aberrated imagery using in-line filters. The second modification implemented was insertion of ground glass in the collimating system, providing capability to continuously vary the effective source size. The ground glass rotates to remove the affects of coherent speckle from the diffuse field. Photographs of the improved test image were taken to record system response under different illumination conditions.

Attached to this Activity Summary is the Program Plan that describes program direction for the immediate goals. Details of the effort conducted during this visit are available in the laboratory notebook, copies of which are delivered with the monthly report. The next program visit is planned for September 23, 24.

PSC/c
Attachment

STAT

Program Plan

To: John C.

STAT

From:

Subject: Program direction for
low contrast image manipulation.

The present status of this program gives us a system set-up that is workable and flexible. Also, a number of low contrast, low frequency attenuation filters are available, together with high density filters. The present requirement is to construct a number of filters ~~having~~ more diameter selections. We will therefore fabricate a series of filters between densities of 0.4 to 0.7, and radii from 2 to 10 mm. in 2 mm. increment. We intend to have these fabricated during the week of 21 September for use with

the presently available low contrast D.L. resolution target. We will use this target to evaluate gains with the combination of system configuration and low frequency attenuation filters.

The second requirement on which preliminary work should be initiated is that of target generation. The resolution target is only intended for a means to demonstrate and evaluate system response for that specific input. Using these results we will have expected response characteristics to apply to continuous tone targets. It will be important therefore to generate target inputs that are relevant to the low contrast continuous tone image problem. Relevant imagery should be used for this target series.

Outline of requirements

Low frequency attenuation filters, with maximum density between 0.4 to 0.7, of 2, 4, 6, 8 + 10 mm diameter.

To be completed by 24 Sept.

Targets, relevant to customer interests, continuous tone, enlarged to place maximum frequency to within 40 l/mm. of optical processor-system.

To be initiated by 21 Sept.

Evaluation of low frequency attenuation filters using low contrast D.L. resolution target, and other resolution targets when desirable, to assess contrast and high frequency enhancement trends obtained from system-filter combinations.

To be completed by 24 Sept.